tion with chronic productive mastitis and attended by compensatory regeneration of epithelial acini, and those cases which follow lactation hyperplasia, are among the most malignant of all known varieties of cancer of the breast. The adenocarcinomata of the gallbladder associated with regenerative efforts on the part of the mucosa to repair lesions mechanically produced by gall-stones, are exceedingly malignant, and give rise to extensive metastases and to early involvement of contiguous structures. Carcinoma of the prostate is practically always associated with histological changes indicating neoplasmic transformation of regenerated epithelial tubules occurring in association with chronic interstitial prostatitis, and the same is true of carcinoma arising on the basis of adenomatoid hyperplasia of liver cells in cirrhosis. On the other hand, carcinoma springing from apparently mature tubules, or in situations where cells are protected from injury, are apparently less active in the matter of producing secondary growths. The explanation, I think, lies partly in the fact that regenerated tubules often approach the fetal type of architecture, and in them the function of growth is a prominent if not a dominant feature, whereas tumors springing from apparently mature epithelium are composed of cells not so markedly consecrated to assimilation and reproduction, such, for example, as the colloid-producing cancers of the thyroid, the milk-producing cancers of the breast, etc.

10. Of 28 cancers of the lower intestinal tract, 15, or 53.5 per cent., were not accompanied by infiltration of surrounding structures or by metastasis. This is in striking contrast to the high degree of malignancy shown by tumors of the stomach and upper intestine.

I wish to acknowledge, with thanks, assistance rendered by Dr. E. E. Stern, of the interne staff of Bellevue Hospital.

THE DIFFERENTIAL DIAGNOSIS OF MEDIASTINAL CONDITIONS.

By A. McNiel Blair, M.D.,
SOUTHERN PINES, N. C.

Anatomically the mediastinum is divided into an anterior position lying in front of the roots of the lungs and a posterior position behind them, the two being continuous; but since the use of the roentgen-rays and perfected fluoroscopic examinations (by placing the patient in a right oblique anteroposterior position), clinically three distinct mediastinal spaces are made apparent, and are called the anterior, medial, and posterior.

The anterior mediastinal space contains the lymph nodes, the areolar tissue, and the thymus or its remains. The medial and posterior contain the heart with its afferent and efferent vessels, the trachea, the bronchi, the esophagus, thoracic duct, vagus, phrenic and sympathetic nerves, and lymph nodes.

As thoracic aneurysm is frequently the cause of sudden death referred without autopsy to other causes, and is more common than was once supposed, the condition being so often overlooked, I will dwell more especially upon thoracic aneurysm, using it as a working basis from which the differential points of diagnosis of mediastinal conditions generally may the better be brought out, in view of the common symptomatology of mediastinal conditions in general.

When the walls of an artery become diseased singly or *en masse*, with a resulting dilatation, we have a condition called aneurysm; therefore a true aneurysm represents a more or less localized *dilatation of an artery, due to the weakening effect of a chronic degenerative arteritis, syphilis standing first* as the cause of a large majority of the cases.

Intemperance in eating and drinking, physical and mental overwork or overstrain may act as contributory causes, the first symptoms often arising after severe or prolonged muscular effort. Some authors describe "dating of symptoms" from trauma, such as severe falls or railroad accidents. It is not improbable, however, that a congenital weakness of the vessels existed primarily, due to inherited process, traceable to one of the factors before mentioned.

Greene states: "Roughly speaking, three-fourths of all aneurysms are aortic; nineteen-twentieths of these are found in the thoracic aorta; of these 90 per cent. are saccular; from 80 per cent. to 90 per cent. occur in the male, and 50 per cent. occur between the ages of thirty-five and fifty." The chief points of attack are the root of the aorta, the junction of the ascending and transverse portions, and the descending arch, in the order indicated.

First let us consider the anatomical arrangement. The arch consists of three portions: the ascending, the transverse, and the descending. The ascending lies behind the pulmonary artery, at the level of the third costal cartilage, being separated from the sternum by the pericardium only, which covers it for about 5 cm.; therefore, aneurysms existing in the ascending portion may rupture into the pericardial cavity.

The transverse portion of the arch passes from a point corresponding to the first right interspace, directly backward into the mediastinum, to the left of the vertebral column, giving off three branches: the innominate, the left common carotid, and the subclavian arteries.

The descending or thoracic aorta begins at the third dorsal vertebra and passes along the median line to the aortic opening in the diaphragm.

Look for a moment at the cross-section of the chest and consider "that a transverse line touching the anterior surface of the bodies of the dorsal vertebra lies about the middle of the anteroposterior diameter of the thorax," and as the symptoms are dependent upon size, site, and direction of the growth of the aneurysm, the condition may remain latent even with large dilatation, or may be manifested by distinct pressure effects, with or without external physical signs. It may grow forward to the sternum, eroding the latter, appearing as a pulsating tumor just at the manubrium or to the left of it.

"The arch being in close contact behind, with the trachea, esophagus, thoracic duct, and left recurrent nerve, which winds around it; all these may be compressed by the growth or it may burst into the trachea or esophagus, causing fatal hemorrhage."

The orifice of one of the large branches may be closed by atheromatous changes, causing a disappearance or delay in the radial pulse on the corresponding side. This brings us to the old classification: (*a*) aneurysms with signs but no symptoms; (*b*) aneurysms with symptoms but no signs; (*c*) aneurysms with neither symptoms nor signs.

The so-called classical symptoms, we are told, develop only in certain cases, usually when terminal stages have been reached, and in these cases the diagnosis is comparatively easy. But what about the remainder of these cases, in which wrong diagnoses simply permit of the further shortening of the already shortened term of life allotted to this class of sufferers?

The usual symptoms complained of by the patient are pain, precordial oppression, difficulty in breathing, and feelings of general weakness, along with one or more of the predominant pressure phenomena.

Behan, in his book on *Pain*, in speaking of the pain in aneurysm, describes it as constant and gnawing, as a rule. In some cases it is paroxysmal, though often in the early stages it may be entirely absent. In many cases the patient locates the pain over the tumor mass by pressing over the affected area with his hand. A characteristic of the disease is that deep pressure is always grateful.

The pain above described as gnawing, boring, etc., is caused by pressure upon the chest wall, while upon the sensory nerves the pain is referred to their peripheral distributions. These referred pains vary with the situation of the tumor.

Aneurysms of the thoracic aorta, however, do not produce so much pain as do those of the abdominal aorta. In all cases of suspected aneurysm, careful inquiry should be made as to the presence of pain, because the patient frequently neglects to mention it.

The pressure phenomena have been ingeniously classified as follows:

1. Pressure upon the esophagus results in dysphagia.
2. Upon the trachea, pressure causes the brazen cough (gander cough), also dyspnea, stridor, bronchorrhea, and hemoptysis even without rupture of aneurysmal sac.
3. Upon the root of the lung and pleura, pressure leads to deficient

lung aëration, with symptoms suggesting phthisis and pulmonary collapse, *e. g.*, case cited by Dr. John Pryor, during his service with Professor Koch. The patient responded to tuberculin reaction, but died ten days later, and autopsy showed a ruptured aneurysmal sac.

4. Pressure upon the nerve trunks results in the neuralgic type of pain, being paroxysmal and intermittent.

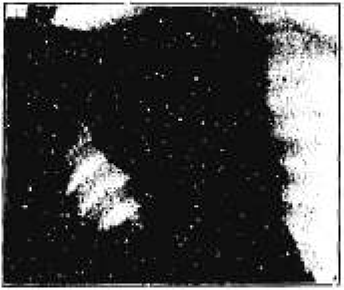

FIG. 1.—Aortic aneurysm. Mr. G., aged thirty-six years. Luetic history positive. Blood-pressure reading: right, 125-110; left, 115-95. Characteristic physical signs but no symptoms.

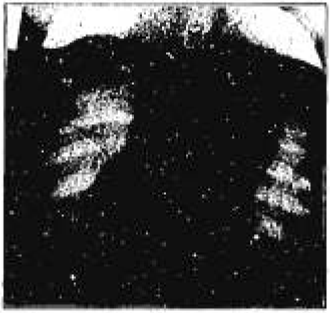

FIG. 2.—Aortic aneurysm. Mr. C. P. Y., aged fifty years. Luetic history positive. Blood-pressure: right, 125-90; left, 110-60. No characteristic physical signs, except delayed left radial pulse. Expiratory type of dyspnea, with excessive localized sweating. (Negative is shown reversed.)

A point of difference in the pain of aneurysm and aortitis is exemplified in Figs. 3 and 4. In this particular patient the pain was localized at the right of the third costal cartilage and over the middle portion of the manubrium, and was referred to the back of the neck and over the shoulders, shooting to the back of the head. It differed from the description of aneurysmal pain, in that it was sudden in its onset, occurred often in the epigastrium, and resembled angina pectoris in severity and suddenness. Paroxysms lasting only a few minutes were often produced by exercise and ingestion of food, and elevation of arterial pressure when accompanied by contraction of the peripheral superficial vessels.

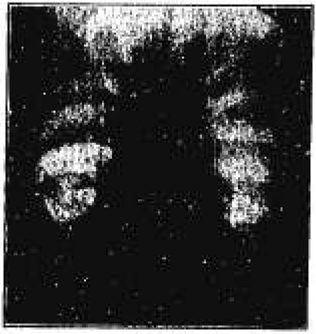

FIG. 3.—Miss McC., aged sixty-three years. Blood-pressure, 150-125. (See text.) In this case anginal type of pain experienced, with unusual distribution, and emphasizes Behan's description of difference in the type of pain in aortitis from that of true aneurysm. Patient died suddenly, during apparent convalescence, from lobar pneumonia.

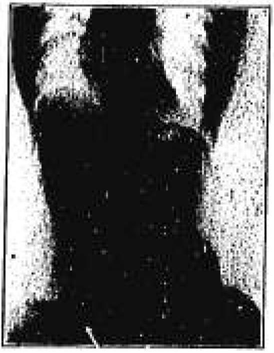

FIG. 4.—Miss McC., aged sixty-three years. Abdominal findings in Fig. 3, with aortitis and aortic dilatation.

5. Pressure upon the pulmonary artery gives a systolic murmur, due to primary hypertrophy of the right ventricle, with subsequent dilatation of right ventricle.

6. From the sympathetic pressure we have dilated or contracted pupils, unilateral sweating, or pallor.

7. From pressure on the cardiac plexus, the anginal attacks.

8. While edema of the upper extremity and cyanosis come from the superior vena cava pressure.

9. Loss of flesh usually occurring in these cases, the resulting marasmus might readily be traceable, in part, to pressure upon the thoracic duct.

10. While the vagus interference could result in dyspepsia, nausea, vomiting, dyspnea, and hiccough.

11. Unilateral paralysis results from the phrenic pressure.

12. While hoarseness, aphonia, spasm or paralysis of the left vocal cord and paroxysmal dyspnea come from pressure on the recurrent laryngeal nerve. This classification of pressure symptoms applies to mediastinal growths in general, including aneurysms.

It is hardly necessary to go over the physical signs in detail; I wish only to touch upon certain points.

Inspection is very important. The manubrium and the back, between the left scapula and the spine, should come in for special scrutiny.

A visible tumor, yielding expansile pulsation, is rarely met with. The peripheral signs of associated aortic regurgitation may be present. Cardiac hypertrophy, as indicated by the apex beat, is commonly but not invariably associated. Atheromatous changes in peripheral vessels; cyanosis, localized edema; unequal pupils, vasomotor symptoms, stridor, visible dyspnea; paralysis of the vocal cords associated with hoarseness or aphonia; and brazen cough are all recognized by aid of inspection.

In palpation one seeks to elicit the expansile pulsation and thrill and the so-called diastolic shock.

Tracheal tugging, described by Oliver, has been met with in so many cases other than aneurysm, and has been absent when aneurysm actually existed, that it is not so important as we were once taught, for example, in a case of adhesions of the left pleura (Fig. 5) this physical sign was in evidence. The palpation of the radial pulses and carotids, for comparison, is very important.

In aneurysm of the ascending portion of the arch involving the innominate the right radial and carotid are affected; in the descending portion, the left radial. A delayed pulse may accompany aneurysm of the transverse portion.

As to percussion, auscultatory percussion is by far the more reliable, and may be further checked by use of the tuning fork, as auscultatory findings are not constant factors, owing to coexisting or associated valvular disease. One can hear at times a systolic bruit, often harsh, vibrant, and associated with palpable thrill, coming from or produced by the sac itself.

A localized systolic murmur heard at the left back is given as an important sign. A distinct ringing metallic second sound heard, not over the aortic valve itself, but over the sac, is given by Greene as a most important sign. It should be added that much is to be learned from systematic blood-pressure readings, not from one arm only but from both, and compared. The systolic as well as the diastolic readings are necessary, as the variation of the pulse-pressure on the two sides is most important. And last, but not least, often the fluoro-

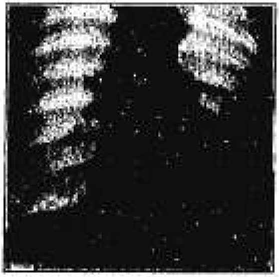

FIG. 5.—Mrs. J. L. R., aged fifty years. Negative Wassermann. Marked cardiovascular symptoms. Blood-pressure, 164–140. Tracheal tug. Present condition shown to be due to left pleural adhesions and thickening, with mechanical traction accounting for aortal symptoms.

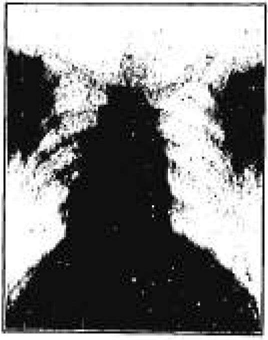

FIG. 6.—Miss L., aged twenty-one years. Tuberculosis of bronchial glands only; showing type of mediastinal infiltration in this class of cases.

scopic and roentgen-ray examination offer the only means of an early diagnosis at our command.

Differential Diagnosis. Mediastinal abscess is differentiated by its rapid development with symptoms of suppuration, and absence of aneurysmal symptoms other than those from pressure.

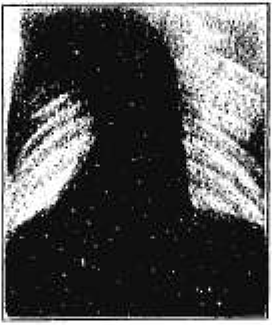

Fig. 7.—Dr. J. W. B., aged forty-seven years. Sarcoma of the mediastinum; left-sided glandular involvement of the sublingual, submaxillary and cervical glands, along with tongue involvement. Case strongly resembled Hodgkin's disease. (Negative is shown reversed.)

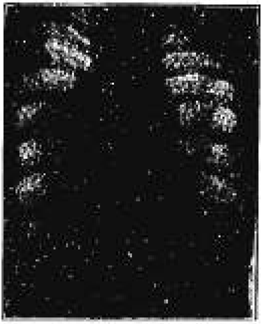

Fig. 8.—Miss E. M. E., aged forty-five years. Blood-pressure, 145-110. Bronchial asthmatic dyspnea included because of cardiovascular symptoms in the case. Bronchial glands, with dilatation of the bronchi contributory factors.

Pulmonary fibrosis, or any case involving the retraction of the lung, may give rise to suggestive pulsation in aneurysmal areas; but ordinary methods reinforced by fluoroscopic examination of the arch will exclude this condition.

Pulmonary tuberculosis, with large cavity, adjacent to aneurysmal areas, may produce pulsation and certain aneurysmal signs, but history, sputa, breath sounds, etc., should prevent error.

Anemic pulsations can be readily differentiated.

FIG. 9.—Mr. L. P. S., aged sixty-three years. Cardiac hypertrophy and aortic dilatation chronic. Symptoms of decompensation; no pain; dyspnea marked; gastro-intestinal disturbance. Sudden death.

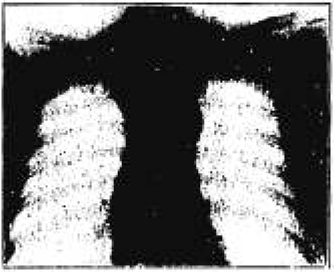

FIG. 10.—Mr. W. J., aged seventy-one years. Senile aortic dilatation presenting itself in the course of cardiac hypertrophy associated with interstitial nephritis.

Malignant growths in the mediastinum are best differentiated by means of the roentgen-rays. In their absence, knowledge of primary focus of malignant growth, absence of auscultatory signs of aneurysm, rapid emaciation, absence of expansile pulsation should be of material help in differentiation.

The coexistence of the two conditions, malignant growth and aneurysm, have been reported.

Growths of the mediastinum may call for differentiation. Goodkind speaks especially of those which may originate:

(1) Primarily from structures within the mediastinum; (2) from contiguous organs, growth of which may encroach upon the mediastinal space (lungs, pleuræ, and thyroid); (3) metastatic growth from distant organs (breasts, gastro-intestinal tract, especially rectum, uterus, prostate, and kidney); (4) Hodgkin's disease and the leukemias.

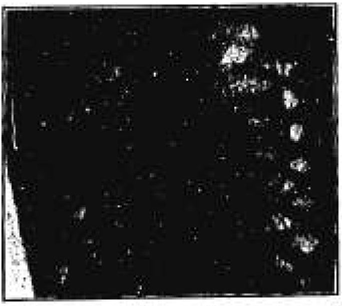

FIG. 11.—M. H., aged thirty-six years (colored). Wassermann positive. Gummatous formation in the mediastinum (cystic) and gumma in the right middle lobe; no pain. Stridulous type breathing; expiratory type of dyspnea; aphonia; emaciation.

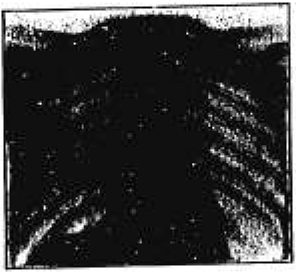

FIG. 12.—M. H. (colored), showing effects after two months of antiluetic treatment

Among the rarer forms he also mentions fibromas, lipomas, myomas, etc., and gummas. He points out that the more common growths of the mediastinum are, however, sarcomas and carcinomas, and emphasizes the fact that aneurysms may simulate mediastinal growths. As to differential diagnosis of the latter, he states that the general symptoms are those common to malignancy: weakness, loss of weight, secondary anemia with a progression to complete marasmus.

Local symptoms are dependent upon the structures compressed. Dyspnea is the most common. Pain is usually dull, of aching type, and may be located quite remote from the neoplasm.

With growths in the posterior mediastinum, causing compression on the emerging nerve roots from the vertebral column, severe pain may be present in the back or along the lateral chest wall.

In a recent article, Guttman and Neuhof[1] offer the following explanation of the marked difference in the two brachial blood-pressures, and in the two radial pulses, in conjunction with laryngeal paralysis, which so closely resembles the clinical syndrome of aortic aneurysm: "That the dilated pulmonary artery was probably wedged in with sufficient force under the aortal arch, and especially opposite the origin of the left subclavian artery, as to cause interference with the circulation of the latter and consequent difference between the two sides in the brachial blood-pressure and in the radial arteries."

The extrabronchial causes of tracheobronchial stenosis, according to Lord,[2] require differentiation.

These extrabronchial causes comprise, for the most part, diseases which develop in or about the mediastinum or invade this region, as in a case of malignant disease by metastasis. They may also give indication of their presence by the aneurysmal syndromes before mentioned, *i. e.*, by dulness in the supracardiac region or over the vertebra between the third and ninth dorsal spine and such signs of pressure upon other organs as dysphagia, inequality of the pupils, or the pulses, variation in the blood-pressure in the two arms, "tracheal tug," recurrent laryngeal paralysis, engorgement of the vessels of the head or neck or one arm, and dilated superficial thoracic veins.

The history of syphilis, attacks of pain like angina pectoris, pulsation of the dull area, systolic thrill and murmur, diastolic shock, and aortic regurgitation speak for aneurysm.

Cachexia and enlarged cervical or axillary glands suggest malignant disease.

Mediastinal involvement in a child with tuberculosis is likely to be due to enlarged and tuberculous glands.

Examination with the roentgen rays is important and may lead to the detection of extrabronchial disease, of which there is no indication on physical examination.

Syphilis of the lung, more especially in reference to gummatous formations, may simulate aneurysm. Such a diagnosis may be based on: (*a*) Knowledge of syphilitic infection followed by secondary manifestations and the coexistence, with the pulmonary processes, of other tertiary syphilitic lesions; (*b*) ulceration or stenosis of the trachea or bronchi, wherein is suggestive evidence; (*c*) positive Wassermann reaction; (*d*) the roentgen-rays.

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[1] Radial Pulse Difference and Left Recurrent Nerve Paralysis Due to Mitral Stenosis, Jour. Am. Med. Assn., January 29, 1916, p. 336.

[2] Diseases of the Bronchi, Lungs, and Pleuræ.

As to gummas, according to Lord, these may be found in any part of the lungs, more commonly within than on the surfaces. Favorite sites for this lesion are the middle lobe of the right lung principally and in the hilum, and are usually without symptoms.

Cough and dyspnea are frequently met with; pain is rarely experienced. Emaciation may exist, with extensive pulmonary disease, as seen in diffuse fibroid induration.

It is to be noted in closing that the thymus gland may degenerate and undergo sarcomatous changes and may simulate aneurysm, thus calling for differentiation.

I wish especially to emphasize that there is no one single physical sign of aneurysm which may not be produced by other conditions than aneurysm. Moreover, it is extremely difficult to differentiate between a transmitted pulsation and a true expansile pulsation. The uniform method of checking all physical examinations of the chest in doubtful cases with the fluoroscope or roentgen-ray plates is to be commended as the only means which will lead to more accurate and early diagnosis of mediastinal conditions.

THE SIGNIFICANCE OF URETERAL TUBERCLE BACILLURIA.[1]

By Edwin Beer, M.D.,
NEW YORK.

(From the Surgical Service of Mount Sinai Hospital.)

The problem that I propose to lay before you tonight is replete with difficulties, and may be encountered by anyone who deals with patients suffering from urogenital tuberculosis. I fear that in this field very few categorical statements are permissible, and that in each individual case the surgeon will have to carefully weigh the evidence before arriving at the conclusion that he is dealing with a case of renal tuberculosis or not. In my experience with cases of genital tuberculosis this problem has been most complicated, and in a perusal of the scanty literature I find that others have met very much the same difficulties as I have encountered. A failure to properly interpret the clinical findings has repeatedly led clinicians astray and has suggested the belief that occasionally patients suffering from renal tuberculosis are cured by non-surgical procedures.

A brief review of the following published cases will illustrate

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[1] Read before the Genito-urinary Section, New York Academy of Medicine, February 21, 1917.